

## INTRODUCTION

One of the major considerations during trail implementation and design is cost. The potential cost of a trail may have implications on what types of funding are used, whether the trail project is phased or built all at once, and what surface is installed. It is important for trail funders and trail implementers to have a general understanding of trail costs at the inception of the project, so they may budget accordingly.

*Iowa Trails 2000* includes an overview of estimated trail costs for a variety of trail types. This cost analysis is designed to accomplish three goals:

- ◆ To assist implementers of trail projects (state agencies, local and regional governments, non-profit groups, etc.) in properly budgeting for trails and in seeking adequate funding.
- ◆ To set forth an estimated cost for the statewide trails vision as shown in Chapter 3 of *Iowa Trails 2000*.
- ◆ To assist policy-makers in evaluating implementation progress and in allocating adequate resources toward the completion of the trails system.

## ASSUMPTIONS

Trail construction costs can vary due to a variety of factors, including local conditions, trail type (use mode), and support services that will be included (see Chapter 4: Design Guidelines). This cost analysis, therefore, is a general guideline for the purpose of preliminary estimation of trail costs. More detailed cost estimation should be performed at other points in the trail implementation process, particularly at the time of application for funding, during preliminary design, and prior to bidding for construction.



Because this cost analysis is a general guideline that applies to a wide variety of trails, certain assumptions must be made. These assumptions define what has been considered as part of the cost analysis, and articulate the limitations of this type of exercise.

- ◆ All dollar amounts are in Year 2000 dollars, and do not include allowances for inflation. A discussion on the effects of inflation is included after the unit costs, beginning on page 5-5.
- ◆ Trail widths and surfaces are according to design guidelines listed in Chapter 4. Clearing and grubbing of trees and brush includes the width of the trail and associated clear zones. Granular subbase extends one foot beyond the edge of the trail on each side.
- ◆ Grading costs assume moderately flat or partially prepared (railroad grade) surfaces. Trails in new corridors in hilly areas may incur higher grading costs.
- ◆ None of the costs for trail grading take into account adverse soil conditions, such as contamination or severely wet soils. Such situations will require additional grading and/or excavation and will increase project cost.
- ◆ Granular subbase refers to Iowa DOT-approved aggregate placed under a hard surface trail to a depth of 4 inches.
- ◆ Granular surfacing refers to crushed limestone paving (or similar) at a depth of 4 inches.
- ◆ Asphalt surfacing has a depth of 4 inches.

- ◆ Concrete surfacing has a depth of 4 inches.
- ◆ Wood chip surfacing has a depth of 2 inches.
- ◆ Seeding/mulching includes broadcast seeded turf grass with straw laid down to prevent erosion. Additional erosion control on steep slopes is not included.
- ◆ Additional costs refer to typical drainage considerations, such as swales, culverts, or waterbars; and support services, including rest areas, signage, and pavement markings. These are based on a typical percentage of trail cost.
- ◆ Contingencies are included in all trail costs to account for localized increases in material costs, increases in labor cost due to time of year and contractor availability, and other unforeseen cost increases.
- ◆ Costs by trail type (tables 5-3 through 5-12) are for construction only and do not reflect planning, design, administration, or subsequent operations and maintenance.
- ◆ Some numbers are rounded for ease of calculation.

## UNIT COSTS

Table 5-1 shows general costs for elements typically included in trail projects. These unit costs are used to develop overall costs for each type of trail (see “Trail Costs” beginning on page 5-6).



TABLE 5-1 UNIT COSTS FOR TRAIL ELEMENTS (INSTALLED)

Trail element	Unit	Price per unit (year 2000 construction)
Clearing and grubbing	Acre	\$2,000.00
Grading for hard-surfaced trails	Mile	\$3,000.00
Grading for natural-surfaced trails	Mile	\$2,500.00
Granular surfacing	Sq. ft.	\$.40
Granular subbase	Sq. ft.	\$.40
Asphalt surfacing	Sq. ft.	\$1.00
Concrete	Sq. ft.	\$2.25
Wood chips	Sq. ft.	\$.40
Seeding/mulching	Acre	\$1,600.00
Other costs (drainage, signage, and support services)	Mile	10% of trail cost
Planning	Mile	2% of trail cost
Preliminary design	Mile	2% of trail cost
Construction documents	Mile	5% of trail cost
Construction services	Mile	5% of trail cost
Administration	Mile	5% of trail cost

### — **PLAN REVIEW**

Most trail projects will require review by a variety of state and regional agencies. This review, in many cases is required by law. Trail implementers should consider that, while these reviews may not increase the actual project cost, they will require time, which may affect project schedule or result in additional fees for consultants. Many trail projects will have to be reviewed for existing polluted sites, existing cultural/archaeological resource impacts, potential wetland or floodplain impacts, and acceptability of roadway crossings.

## — **RIGHT-OF-WAY ACQUISITION**

In general, representative costs for the purchase of right-of-way will vary drastically from region to region. Local or regional governments will most likely be best equipped to estimate costs for property acquisition in their particular area. The DOT makes right-of-way purchases based on fair market value for the particular county where land is being purchased. In rural counties, fair market value is currently approximately \$2,000 per acre. Ranges in price will occur depending on the agricultural potential of the land. In urban areas, acquisition costs will vary more significantly than elsewhere. Statewide, the approximate cost for land in urban areas may range from \$12,000 to \$15,000 per acre. In some cases, however, urban land may be registered on a square foot basis, with costs being even higher than the above figures.

When estimating the cost of land acquisition, local governments should speak with a local real estate appraiser to gain an understanding of actual costs for land in the general area and in specific locations to be acquired for trail use. Many grants require such an appraisal..

## — **INFLATION COSTS**

The most recent dollar standard currently available is for 1999. Differences, however, between 1999 dollars and 2000 dollars are minor enough that inflation effects may be estimated based on the 2000 dollar figures included in Table 5-1.

The “Consumer Price Index (CPI) Conversion Factor to Convert 1999 Dollars” is located at [www.orst.edu/Dept/pol\\_sci/fac/sahr/cv99.pdf](http://www.orst.edu/Dept/pol_sci/fac/sahr/cv99.pdf) and is a useful tool for projecting inflation effects. The chart shown on that Web site offers projected conversion factors based on 1999 dollars. Table 5-2 shows some typical inflation calculations based on 1999 dollars.



TABLE 5-2 INFLATION EFFECTS

1999 Dollars	Multiplier for 2005 Dollars	2005 Dollars	Multiplier for 2010 Dollars	2010 Dollars
\$1	1.162	\$1.16	1.318	\$1.32
\$100	1.162	\$116.20	1.318	\$131.80
\$1,000	1.162	\$1,162.00	1.318	\$1,318.00
\$1,000,000	1.162	\$1,162,000.00	1.318	\$1,318,000.00

### — **BRIDGES**

The actual cost for bridges will vary depending on existing conditions. As a trail moves into the development stage, the trail developer should consult with a structural engineer to determine a final estimated cost. The following estimated costs for bridges will be applicable in many cases.

- ◆ Estimated cost for new pedestrian/bicycle bridges: \$100/square foot.
- ◆ Estimated cost for redecking of existing bridges to accommodate surfaced trails (does not include trail surfacing or fencing): \$50/square foot.
- ◆ Estimated cost for wetland boardwalks: \$50/square foot.

## TRAIL COSTS

Tables 5-3 through 5-12 show estimated costs for each type of trail mode considered in *Iowa Trails 2000*. These trail costs are designed to serve as a guide for trail planning and initial cost estimation, and should not be considered a detailed cost analysis.

TABLE 5-3 ESTIMATED COST FOR NATURAL SURFACE  
HIKING/MOUNTAIN BIKE TRAILS: 5-FOOT WIDTH

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	9 feet	1	\$2,000
Grading	mile	\$2,500		1	\$2,500
Seeding/mulching	acre	\$1,600	4 feet	.5	\$800
<b>Subtotal</b>					<b>\$5,300</b>
Other costs	10% of trail cost				\$530
Contingency	15% of trail cost				\$795
<b>TOTAL COST PER MILE</b>					<b>\$6,625</b>

TABLE 5-4 ESTIMATED COST FOR WOOD CHIP HIKING TRAILS:  
5-FOOT WIDTH

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	9 feet	1	\$2,000
Grading	mile	\$2,500		1	\$2,500
Wood chips	sq ft	\$.40	5 feet	26,400	\$10,560
Seeding/mulching	acre	\$1,600	4 feet	.5	\$800
<b>Subtotal</b>					<b>\$15,860</b>
Other costs	10% of trail cost				\$1,586
Contingency	15% of trail cost				\$2,379
<b>TOTAL COST PER MILE</b>					<b>\$19,900</b>



**TABLE 5-5 ESTIMATED COST FOR GRANULAR HIKING TRAILS:  
5-FOOT WIDTH**

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	9 feet	1	\$2,000
Grading	mile	\$3,000		1	\$3,000
Granular subbase	sq ft	\$.40	7 feet	36,960	\$14,785
Granular surfacing	sq ft	\$.40	5 feet	26,400	\$10,560
Seeding/mulching	acre	\$1,600	4 feet	.5	\$800
<b>Subtotal</b>					<b>\$31,145</b>
Other costs	10% of trail cost				\$3,115
Contingency	15% of trail cost				\$4,671
<b>TOTAL COST PER MILE</b>					<b>\$39,000</b>

**TABLE 5-6 ESTIMATED COST FOR PEDESTRIAN TRAILS: ASPHALT  
SURFACE: 6-FOOT WIDTH**

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	10 feet	1.25	\$2,500
Grading	mile	\$3,000		1	\$3,000
Granular subbase	sq ft	\$.40	8 feet	42,240	\$16,896
Asphalt	sq ft	\$1	6 feet	31,680	\$31,680
Seeding/mulching	acre	\$1,600	4 feet	.5	\$800
<b>Subtotal</b>					<b>\$54,876</b>
Other costs	10% of trail cost				\$5,488
Contingency	15% of trail cost				\$8,231
<b>TOTAL COST PER MILE</b>					<b>\$68,600</b>



TABLE 5-7 ESTIMATED COST FOR PEDESTRIAN TRAILS:  
CONCRETE SURFACE: 5-FOOT WIDTH

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	9 feet	1	\$2,000
Grading	mile	\$3,000		1	\$3,000
Granular subbase	sq ft	\$.40	7 feet	36,960	\$14,785
Concrete	sq ft	\$2.25	5 feet	26,400	\$59,400
Seeding/mulching	acre	\$1,600	4 feet	.5	\$800
<b>Subtotal</b>					\$80,000
Other costs	10% of trail cost				\$8,000
Contingency	15% of trail cost				\$12,000
<b>TOTAL COST PER MILE</b>					<b>\$100,000</b>

TABLE 5-8 ESTIMATED COST FOR NON-MOTORIZED MULTI-USE TRAILS (SINGLE TREADWAY): GRANULAR SURFACE, 10-FOOT WIDTH

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	14 feet	1.7	\$3,400
Grading	mile	\$3,000		1	\$3,000
Granular subbase	sq ft	\$.40	12 feet	63,360	\$25,344
Granular surfacing	sq ft	\$.40	10 feet	52,800	\$21,120
Seeding/mulching	acre	\$1,600	4 feet	.5	\$800
<b>Subtotal</b>					\$53,664
Other costs	10% of trail cost				\$5,367
Contingency	15% of trail cost				\$8,050
<b>TOTAL COST PER MILE</b>					<b>\$67,100</b>



TABLE 5-9 ESTIMATED COST FOR NON-MOTORIZED MULTI-USE TRAILS (SINGLE TREADWAY): ASPHALT SURFACE, 10-FOOT WIDTH

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	14 feet	1.7	\$3,400
Grading	mile	\$3,000		1	\$3,000
Granular subbase	sq ft	\$.40	12 feet	63,360	\$25,344
Asphalt	sq ft	\$1	10 feet	52,800	\$52,800
Seeding/mulching	acre	\$1,600	4 feet	.5	\$800
<b>Subtotal</b>					<b>\$85,344</b>
Other costs	10% of trail cost				\$8,534
Contingency	15% of trail cost				\$12,802
<b>TOTAL COST PER MILE</b>					<b>\$106,700</b>

TABLE 5-10 ESTIMATED COST FOR NON-MOTORIZED MULTI-USE TRAILS (SINGLE TREADWAY): CONCRETE SURFACE, 10-FOOT WIDTH

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	14 feet	1.7	\$3,400
Grading	mile	\$3,000		1	\$3,000
Granular subbase	sq ft	\$.40	12 feet	63,360	\$25,344
Concrete	sq ft	\$2.25	10 feet	52,800	\$118,800
Seeding/mulching	acre	\$1,600	4 feet	.5	\$800
<b>Subtotal</b>					<b>\$151,344</b>
Other costs	10% of trail cost				\$15,134
Contingency	15% of trail cost				\$22,701
<b>TOTAL COST PER MILE</b>					<b>\$189,200</b>

**TABLE 5-11 ESTIMATED COST FOR SNOWMOBILE OR EQUESTRIAN TRAILS: 10-FOOT WIDTH**

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	14 feet	1.7	\$3,400
Grading	mile	\$2,500		1	\$2,500
Seeding/mulching	acre	\$1,600	14 feet	1.7	\$2,720
<b>Subtotal</b>					<b>\$8,620</b>
Other costs	10% of trail cost				\$862
Design fees	15% of trail cost				\$1,293
<b>TOTAL COST PER MILE</b>					<b>\$10,775</b>

**TABLE 5-12 ESTIMATED COST FOR OHV TRAILS: 8-FOOT WIDTH**

Trail element	Unit	Price per unit	Element width	Units per mile	Trail cost per mile
Clearing and grubbing	acre	\$2,000	10 feet	1.25	\$2,500
Grading	mile	\$2,500		1	\$2,500
<b>Subtotal</b>					<b>\$5,000</b>
Other costs	10% of trail cost				\$500
Design fees	15% of trail cost				\$750
<b>TOTAL COST PER MILE</b>					<b>\$6,250</b>

It is important to note that the per-mile costs listed above may vary drastically, depending on the trail's location, the construction schedule, and many other unforeseen issues. Trail cost estimates throughout the project should always be reviewed by a qualified engineer or other design professional. It is not unusual for actual trail costs to exceed initial estimates.



The following items are commonly found in trail projects. Because of their variability of type and, therefore, cost, specific unit cost numbers are not included. Trail implementers should determine to what extent these items will be included in the trail project, and estimate them accordingly.

- ◆ Fencing, either for safety or ornamental reasons (or both)
- ◆ Walls
- ◆ Special drainage considerations, such as fabrics and soil supplements in wet areas
- ◆ Interpretive facilities
- ◆ Associated parks, trailheads, or other amenities besides basic access points and rest areas
- ◆ Other custom design elements, such as bridges, walls, signage, bollards, benches, trash cans, or bicycle racks.

## **ESTIMATED STATEWIDE TRAILS VISION COST**

*Iowa Trails 2000* maps a statewide trails vision comprised of 4,908 miles of trails. Of this, 517 miles are already in place. The remaining 4,391 miles make up the proposed statewide trails vision. Estimating the cost of this vision depends on two major factors.

First, according to *Iowa Trails 2000*, the statewide trails vision will be implemented by a variety of agencies and groups, who will decide the appropriate modes and surfacing for their particular trail corridor. As shown in Tables 5-3 through 5-12, trail surface has a great bearing on trail cost.

Second, as discussed on page 5-5, the trail costs listed above are affected by inflation. Trails implemented within the next few years may not see significant unit cost increases due to inflation. Trails implemented 10 or 20 years from now, however, may cost more than they would if built today. Due to the extent of the proposed statewide trails vision, a great number of trail miles could be affected by inflation.

Table 5-13, therefore, examines the estimated cost of the statewide system set forth by *Iowa Trails 2000* with the following assumptions:

- ◆ Inflation is not taken into account. All costs are in Year 2000 dollars (for inflation information see page 5-5).
- ◆ For the purposes of estimation, and reflecting the Iowa DOT's commitment to year-round multi-modal use, the estimated system cost is based primarily on multi-use trails (10 feet wide). These trails are the most expensive, thereby allowing for a conservative estimate, and they accommodate the greatest number of use modes, thereby best accommodating all trail users.

Table 5-13 outlines five scenarios for a built-out statewide trails vision for Iowa, as mapped in Chapter 3. It is expected that trails in Iowa will have a variety of different surfaces, reflecting local conditions and desires. As stated above, costs are based on 10-foot multi-use trails. For this type of trail, two surfaces are commonly used: asphalt and granular. In the scenarios below, system-wide costs are based on different proportions of each surface (all granular, half granular/half asphalt, etc.). Each scenario considers the total mileage of proposed new trails shown on the statewide trails vision map: 4,391.



TABLE 5-13 ESTIMATED STATEWIDE TRAILS SYSTEM COST

Trail surface	Cost per mile	Proposed mileage	Total cost
<b>Scenario A: 100% granular</b>			
Granular	\$67,100	4,391	<b>\$294,636,100</b>
<b>Scenario B: 75% granular, 25% asphalt</b>			
Granular	\$67,100	3,293	\$220,960,300
Asphalt	\$106,700	1,098	\$117,156,600
<b>Total</b>		4,391	<b>\$338,116,900</b>
<b>Scenario C: 50% granular, 50% asphalt</b>			
Granular	\$67,100	2,196	\$147,351,600
Asphalt	\$106,700	2,195	\$234,206,500
<b>Total</b>		4,391	<b>\$381,558,100</b>
<b>Scenario D: 25% granular, 75% asphalt</b>			
Granular	\$67,100	1,098	\$73,675,800
Asphalt	\$106,700	3,293	\$351,363,100
<b>Total</b>		4,391	<b>\$425,038,900</b>
<b>Scenario E: 100% asphalt</b>			
Asphalt	\$106,700	4,391	<b>\$468,519,700</b>

The costs listed above for the statewide trails vision are designed to assist the Iowa DOT and other policy-makers and trail implementers in understanding the financial needs associated with *Iowa Trails 2000*. The implementation of this extensive system will require investment from a variety of sources, including multiple state agencies, local communities, and the federal government. In addition to the costs of constructing a statewide trails system is the cost of operating and maintaining that system. The next two chapters describe the means of implementing, operating, and maintaining the statewide trails vision as set forth in *Iowa Trails 2000*.